

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**

What is claimed is:

1. A hockey stick comprising:

a shaft;

a blade connected with the shaft, the blade including an elongated member extending

5 from a tip section to a heel section and having a front face and a back face;

the heel section comprising front-side and back-side facing surfaces that are recessed
relative to adjacent portions of the front and back faces; and

the elongated member further comprising an inner foam core and one or more plies
overlaying the inner foam core, wherein the one or more plies comprise substantially continuous
10 fibers disposed within a matrix material.

2. The hockey stick of claim 1, wherein at least part of one of the fibers is selected
from the group consisting of carbon fiber, aramid, glass, polyethylene, ceramic, boron, quartz,
and polyester.

15 3. The hockey stick of claim 1, wherein at least part of one of the fibers is selected
from the group consisting of carbon fiber, aramid, glass, polyethylene, and ceramic.

4. The hockey stick of claim 1, wherein at least part of one of the fibers is selected
20 from the group consisting of carbon fiber, aramid, and glass.

5. The hockey stick of claim 1, wherein at least part of one of the fibers is selected
from the group consisting of carbon fiber and aramid.

6. The hockey stick of claim 1, wherein at least part of one of the fibers comprises carbon fiber.

7. The hockey stick of claim 1, wherein the recessed front-side and back-side facing surfaces of the heel section are configured to be received in a mating portion of the shaft.

8. The hockey stick of claim 1, wherein the recessed front-side and back-side facing surfaces of the heel section are configured to be received into a slot disposed within the shaft.

10 9. The hockey stick of claim 1, wherein the recessed front-side and back-side facing surfaces of the heel section are configured to be received in a mating portion of an adapter member that connects the blade with the shaft.

10. The hockey stick of claim 1, wherein the recessed front-side and back-side facing surfaces of the heel section are configured to be received into a slot disposed within a mating portion of an adapter member that connects the blade with the shaft.

20 11. The hockey stick of claim 1, wherein the shaft further includes a forward facing surface, a rearward facing surface, a front facing surface, a back facing surface, and a lower end section. the lower end section includes an open-ended slot that extends from the forward facing surface of shaft and is disposed between the front and back facing surfaces of the shaft, wherein

the recessed front-side and back-side facing surfaces of the heel section are disposed within the slot.

12. The hockey stick of claim 11, wherein the slot extends from the forward facing
5 surface through the rearward facing surface of the shaft.

14. The hockey stick of claim 12, wherein the lower end section of the shaft further
includes an end surface generally perpendicular to the forward facing surface and wherein the
slot extends from the forward facing surface through the end surface of the shaft.

10 14. The hockey stick of claim 11, wherein the shaft is constructed at least in part of
wood.

15. The hockey stick of claim 1 further comprising an adapter member that connects
15 the shaft with the blade, the adapter member includes a first end section, a second end section
forward facing surface, a rearward facing surface, a front facing surface, and a back facing
surface, the first end section includes an open-ended slot that extends from the forward facing
surface of the adapter member and is disposed between the front and back facing surfaces of the
adapter member, wherein the recessed front-side and back-side facing surfaces of the heel
20 section are disposed within the slot.

16. The hockey stick of claim 15, wherein the slot extends from the forward facing
surface through the rearward facing surface of the adapter member.

17. The hockey stick of claim 15, wherein the first end section of the adapter member further includes an end surface generally perpendicular to the forward facing surface and wherein the slot extends from the forward facing surface through the end surface of the adapter member.

18. The hockey stick of claim 15, wherein the adapter member is constructed at least in part of wood.

19. The hockey stick of claim 15, wherein the second end section of the adapter member is connected to the shaft.

20. The hockey stick of claim 15, wherein the shaft includes a lower end section that includes a cavity and wherein the second end section of the adapter member is disposed within the cavity of the shaft.

21. The hockey stick of claim 1 further comprising one or more internal bridge structures disposed within the foam core and extending between the front and back faces of the blade.

22. The hockey stick of claim 21, wherein at least one of the one or more internal bridge structures comprises one or more plies of substantially continuous fibers disposed within a matrix material.

23. The hockey stick of claim 21, wherein at least one of the one or more internal bridge structure comprises non-continuous fibers disposed within a matrix material.

24. The hockey stick of claim 1 further comprising one or more internal bridge structures disposed within the foam core and extending between the recessed front-side and back-side facing surfaces of the heel section.

25. The hockey stick of claim 1 further comprising one or more internal bridge
10 structures disposed within the foam core and extending between the front and back faces of the blade and between the recessed front-side and back-side facing surfaces of the heel section.

26. The hockey stick of claim 1, wherein the foam core further comprises a top edge and a bottom edge extending between the front face and back face of the blade, wherein at least
15 part of the bottom edge or the top edge of the foam is overlaid with a durable edging material.

27. The hockey stick of claim 26, wherein at least part of both the top edge and bottom edge of the foam is overlaid with the durable edging material.

28. The hockey stick of claim 26, wherein the durable edging material is selected from the group of materials consisting of thermoplastic resins, thermosetting resins, substantially continuous fibers disposed within either thermoplastic or thermosetting resins, and non-continuous fibers disposed within either thermoplastic or thermosetting resins.

29. The hockey stick of claim 1, wherein the foam core comprises at least one material selected from the group consisting of polyurethane, PVC, and epoxy.

5 30. A blade for a hockey stick comprising:

an elongated member extending from a tip section to a heel section and having a front face and a back face;

the heel section comprising front-side and back-side facing surfaces that are recessed relative to adjacent portions of the front and back faces; and

10 the elongated member further comprising an inner foam core and one or more plies overlaying the inner foam core, wherein the one or more plies comprise substantially continuous fibers disposed within a matrix material.

31. The blade of claim 30, wherein at least part of one of the fibers is selected from
15 the group consisting of carbon fiber, aramid, glass, polyethylene, ceramic, boron, quartz, and polyester.

32. The blade of claim 30, wherein at least part of one of the fibers is selected from
the group consisting of carbon fiber, aramid, glass, polyethylene, and ceramic.

20 33. The blade of claim 30, wherein at least part of one of the fibers is selected from
the group consisting of carbon fiber, aramid, and glass.

34. The blade of claim 30, wherein at least part of one of the fibers is selected from the group consisting of carbon fiber and aramid.

35. The blade of claim 30, wherein at least part of one of the fibers comprises carbon
5 fiber.

36. The blade of claim 30, wherein the recessed front-side and back-side facing surfaces of the heel section are configured to be received in a mating portion of a shaft.

10 37. The blade of claim 30, wherein the recessed front-side and back-side facing surfaces of the heel section are configured to be received within a slot disposed within a shaft.

38. The blade of claim 30, wherein the recessed front-side and back-side facing surfaces of the heel section are configured to be received in a mating portion of an adapter
15 member configured to connect the blade with a shaft.

39. The blade of claim 30, wherein the recessed front-side and back-side facing surfaces of the heel section are configured to be received within a slot disposed within a mating portion of an adapter member configured to connect the blade with a shaft.

20 40. The blade of claim 30 further comprising one or more internal bridge structures disposed within the foam core and extending between the front and back faces.

42. The blade of claim 41, wherein at least one of the one or more internal bridge structures comprises one or more plies of substantially continuous fibers disposed within a matrix material.

5 43. The blade of claim 41, wherein at least one of the one or more internal bridge structure comprises non-continuous fibers disposed within a matrix material.

44. The blade of claim 30 further comprising one or more internal bridge structures disposed within the foam core and extending between the recessed front-side and back-side
10 facing surfaces of the heel section.

45. The blade of claim 30 further comprising one or more internal bridge structures disposed within the foam core and extending between the front and back faces of the blade and between the recessed front-side and back-side facing surfaces of the heel section.

15 46. The blade of claim 30, wherein the foam core further comprises a top edge and a bottom edge extending between the front face and back face of the blade, wherein at least part of the bottom edge or the top edge of the foam is overlaid with a durable edging material.

20 47. The blade of claim 46, wherein at least part of both the top edge and bottom edge of the foam is overlaid with the durable edging material.

48. The blade of claim 46, wherein the durable edging material is selected from the group of materials consisting of thermoplastic resins, thermosetting resins, substantially continuous fibers disposed within either thermoplastic or thermosetting resins, and non-continuous fibers disposed within either thermoplastic or thermosetting resins.

49. The blade of claim 30, wherein the foam core comprises at least one material selected from the group consisting of polyurethane, PVC, and epoxy.

50. A hockey stick comprising:

a shaft;

a blade connected with the shaft, the blade including an elongated member extending from a tip section to a heel section and having a front face and a back face;

the heel section comprising front-side and back-side facing surfaces that are recessed relative to adjacent portions of the front and back faces; and

the elongated member further comprising a core of non-continuous random fibers disposed within a matrix material.

51. The hockey stick of claim 50, wherein at least part of one of the fibers is selected from the group consisting of carbon fiber, aramid, glass, polyethylene, ceramic, boron, quartz, and polyester

52. The hockey stick of claim 50, wherein at least part of one of the fibers is selected from the group consisting of carbon fiber, aramid, glass, polyethylene, and ceramic.

53. The hockey stick of claim 50, wherein at least part of one of the fibers is selected from the group consisting of carbon fiber, aramid, and glass.

54. The hockey stick of claim 50, wherein at least part of one of the fibers is selected from the group consisting of carbon fiber and aramid.

55. The hockey stick of claim 50, wherein at least part of one of the fibers comprises carbon fiber.

10

56. The hockey stick of claim 50, wherein the recessed front-side and back-side facing surfaces of the heel section are configured to be received in a mating portion of the shaft.

57. The hockey stick of claim 50, wherein the recessed front-side and back-side facing surfaces of the heel section are configured to be received into a slot disposed within the shaft.

15

58. The hockey stick of claim 50, wherein the recessed front-side and back-side facing surfaces of the heel section are configured to be received in a mating portion of an adapter member that connects the blade with the shaft.

20

59. The hockey stick of claim 50, wherein the recessed front-side and back-side facing surfaces of the heel section are configured to be received into a slot disposed within a mating portion of an adapter member that connects the blade with the shaft.

60. The hockey stick of claim 50, wherein the shaft further includes a forward facing surface, a rearward facing surface, a front facing surface, a back facing surface, and a lower end section, the lower end section includes an open-ended slot that extends from the forward facing surface of shaft and is disposed between the front and back facing surfaces of the shaft, wherein the recessed front-side and back-side facing surfaces of the heel section are disposed within the
10 slot.

61. The hockey stick of claim 60, wherein the slot extends from the forward facing surface through the rearward facing surface of the shaft

62. The hockey stick of claim 60, wherein the lower end section of the shaft further includes an end surface generally perpendicular to the forward facing surface and wherein the slot extends from the forward facing surface through the end surface of the shaft.

63. The hockey stick of claim 50, wherein the shaft is constructed at least in part of
20 wood.

64. The hockey stick of claim 50 further comprising an adapter member that connects the shaft with the blade, the adapter member includes a first end section, a second end section

forward facing surface, a rearward facing surface, a front facing surface, and a back facing surface, the first end section includes an open-ended slot that extends from the forward facing surface of the adapter member and is disposed between the front and back facing surfaces of the adapter member, wherein the recessed front-side and back-side facing surfaces of the heel
5 section are disposed within the slot.

65. The hockey stick of claim 64, wherein the slot extends from the forward facing surface through the rearward facing surface of the adapter member.

66. The hockey stick of claim 64, wherein the first end section of the adapter member further includes an end surface generally perpendicular to the forward facing surface and wherein the slot extends from the forward facing surface through the end surface of the adapter member.

67. The hockey stick of claim 64, wherein the adapter member is constructed at least in part of wood

68. The hockey stick of claim 64, wherein the second end section of the adapter member is connected to the shaft.

69. The hockey stick of claim 64, wherein the shaft includes a lower end section that includes a cavity and wherein the second end section of the adapter member is disposed within the cavity of the shaft.

70. A blade for hockey stick comprising:

an elongated member extending from a tip section to a heel section and having a front face and a back face;

5 the heel section comprising front-side and back-side facing surfaces that are recessed relative to adjacent portions of the front and back faces; and

the elongated member further comprising a core of non-continuous random fibers disposed within a matrix material.

71. The blade of claim 70, wherein at least part of one of the fibers is selected from the group consisting of carbon fiber, aramid, glass, polyethylene, ceramic, boron, quartz, and polyester.

72. The blade of claim 70, wherein at least part of one of the fibers is selected from
15 the group consisting of carbon fiber, aramid, glass, polyethylene, and ceramic.

73. The blade of claim 70, wherein at least part of one of the fibers is selected from the group consisting of carbon fiber, aramid, and glass.

74. The blade of claim 70, wherein at least part of one of the fibers is selected from the group consisting of carbon fiber and aramid.

75. The blade of claim 70, wherein at least part of one of the fibers comprises carbon fiber.

76. The blade of claim 70, wherein the recessed front-side and back-side facing
5 surfaces of the heel section are configured to be received in a mating portion of a shaft.

77. The blade of claim 70, wherein the recessed front-side and back-side facing
surfaces of the heel section are configured to be received within a slot disposed within a shaft.

78. The blade of claim 70, wherein the recessed front-side and back-side facing
surfaces of the heel section are configured to be received in a mating portion of an adapter
member configured to connect the blade with a shaft.

79. The hockey stick of claim 70, wherein the recessed front-side and back-side
15 facing surfaces of the heel section are configured to be received within a slot disposed within a
mating portion of an adapter member configured to connect the blade with a shaft.

80. A hockey stick adapter member for connecting a hockey stick shaft to a hockey
stick blade comprising:

20 a member extending from a first end section to a second end section and having a forward
facing surface, a rearward facing surface, and an end surface;

the first end section comprising a slot extending from the forward facing surface toward
the rearward facing surface;

the second end section being configured to mate with a hockey stick shaft.

81. The hockey stick adapter member of claim 80, wherein the slot extends through the rearward facing surface.

5

82. The hockey stick adapter member of claim 80, wherein the slot extends through the end surface.

83. The hockey stick adapter member of claim 80, wherein the second end section is configured to mate within a tubular hockey stick shaft.

10

84. The hockey stick adapter member of claim 80, wherein the second end section comprises a mating section that is dimensioned to be received within a tubular hockey stick shaft.

15

85. The hockey stick adapter member of claim 80, wherein the second end section comprises a rectangular mating section dimensioned to be received within a tubular hockey stick shaft.

86. The hockey stick adapter member of claim 80, wherein the second end section comprises a mating section dimensioned to be slidably received within a tubular hockey stick shaft.

20

87. The hockey stick adapter member of claim 80, wherein the second end section comprises a mating section dimensioned to be slidably and snugly received within a tubular hockey stick shaft.

88. The hockey stick adapter member of claim 80, wherein the adapter member is constructed at least in part of wood.

89. The hockey stick adapter member of claim 80, wherein the adapter member comprises a core overlaid with substantially continuous fibers disposed within a matrix material.

90. The hockey stick adapter member of claim 20, wherein the adapter member comprises a core of fibers disposed within a matrix material.

91. A method for manufacturing a composite hockey stick blade comprising the following steps:

(a) providing a foam core having the general shape of a hockey stick blade;

(b) forming an uncured blade assembly by wrapping the foam core with one or more plies comprising substantially continuous fibers pre-impregnated with a curable matrix material;

(c) providing a mold having the desired exterior shape of the blade;

(d) loading the mold with the uncured blade assembly;

(e) applying heat to the mold to cure the blade assembly; and

(f) removing the cured blade assembly from the mold.

92. The method of claim 91 for manufacturing a composite hockey stick blade wherein the mold is configured to impart a recessed surface at the heel of the blade.

93. The method of claim 91 wherein in forming the uncured blade assembly a durable
5 edging material is laid about at least a portion of the circumference of the foam core.

94. The method of claim 91 wherein the mold includes a convex surface configured to impart a cavity into the blade.

95. The method of claim 91 wherein at least part of one of the fibers is selected from the group consisting of carbon fiber, aramid, glass, polyethylene, ceramic, boron, quartz, and polyester.

96. The method of claim 91 wherein at least part of one of the fibers is selected from
15 the group consisting of carbon fiber, aramid, glass, polyethylene, and ceramic.

97. The method of claim 91 wherein at least part of one of the fibers is selected from the group consisting of carbon fiber, aramid, and glass.

98. The method of claim 91 wherein at least part of one of the fibers is selected from the group consisting of carbon fiber and aramid.

99. The method of claim 91 wherein at least part of one of the fibers comprises carbon fiber.

100. A method for manufacturing a composite hockey stick blade comprising the following steps:

(a) providing a mold having the desired exterior shape of the blade;

(b) loading the mold with a mixture of non-continuous fibers disposed in a curable matrix material;

(c) applying heat to the mold to cure; and

(d) removing the cured blade from the mold.

101. The method of claim 100 for manufacturing a composite hockey stick blade wherein the mold is configured to impart a recessed surface at the heel of the blade.

102. The method of claim 100 wherein at least part of one of the fibers is selected from the group consisting of carbon fiber, aramid, glass, polyethylene, ceramic, boron, quartz, and polyester.

103. The method of claim 100 wherein at least part of one of the fibers is selected from the group consisting of carbon fiber, aramid, glass, polyethylene, and ceramic.

104. The method of claim 100 wherein at least part of one of the fibers is selected from the group consisting of carbon fiber, aramid, and glass.

105. The method of claim 100 wherein at least part of one of the fibers is selected from the group consisting of carbon fiber and aramid.

106. The method of claim 100 wherein at least part of one of the fibers comprises carbon fiber.

107. A hockey blade for attachment with a hockey stick shaft comprising:
an elongated member;
10 the elongated member extending from a tip section to a heel section;
the elongated member having a front face and a back face;
the elongated member comprising a core of non-continuous random fibers disposed within a matrix material.